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DRAWINGS ATTACHED

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(54) EASY OPENING CONTAINER

(71) We, CONTINENTAL CAN COMPANY, INC., a Corporation organized and existing under the laws of the State of New York, United States of America, of 633 Third Avenue, New York 17, State of New York, United States of Amrica, of hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to containers and more particularly to a container having an improved easy opening end closure for facilitating the removal of the product from the container.

It is common practice to substitute paper containers for metal containers in the packaging of consumer products such as food and the like. In fact, frozen citrus juices are generally packaged in paper containers. Such paper containers may be either coated or laminated with a plastic material to render the paper water resistant. Under such circumstances should the product so require a metal foil or the like may be laminated to the paper to reduce the air permeability.

These prior containers have generally used metal end closures of which one end closure may be of an easy-opening kind. The metal end closures are usually crimped or double seamed to the ends to be able to withstand the abuse associated with the handling of the containers. The metal structure of the end unit and the seaming operations increase the cost of the container.

The container body may be formed either by spiral winding or may be formed from a blank which is shaped about a forming mandrel with the longitudinal edges adhered in lapped relationship. Under some conditions, the longitudinal edges of the blank may be skived to reduce the thickness of the seam. Containers formed from a blank about a mandrel are commonly designated as canboard.

Canboard containers are held in lapped relationship by means of a thermo- and pressure-responsive adhesive and the metal end units seamed thereto by means of the double or clinched seam. One of the ends may be of an easy-opening kind to facilitate the removal of the product. When the container is used to package frozen citrus juice or the like the frozen product can only be removed from the easily opened end. The removal of the bulk frozen product becomes quite troublesome and time consuming frequently requiring the use of a separate implement to dislodge the frozen bulk.

Moreover, with the easy-opening structure used heretofore, there was no provision for reclosing the container if only a portion of the product was removed. This resulted in either spoilage of the product or the unnecessary waste thereof.

It is an object of the present invention to provide a container of the general kind above described but which has an improved end closure structure which reduces the cost of the container and at the same time eliminates many of the difficulties encountered with respect to the removal and reclosure of the container.

According to the invention a container comprises a tubular body opposite ends of which are closed by end closures individually secured to the body and at least one of which is a removable end closure sealed to the body by a pressure-responsive adhesive, the seal being effected by pressure applied to the removable end closure at normal room temperature and being such as to permit the removable end closure to be peeled from the body.

The adhesive may be a solvent based or a water base-rubber type compound which remains tacky for profonged periods even when exposed to air. This latter characteristic of the adhesive permits the removable end closure to be reapplied a number of times after removal.

Preferably, the removable end closure is a

moulded plastics member having such a thickness as to be flexible and somewhat yieldable upon impact. This characteristic of the material serves as a shock absorber when the filled container is dropped and reduces the stresses imposed on the adhered surfaces of the removable end closure and body sufficiently so that the removable end closure is not inadvertently dislodged.

In order that the invention may be clearly understood embodiments thereof will now be described, by way of example, with reference to the accompanying drawings, in which:—

Fig. 1 is a perspective view of a container according to the invention;

Fig. 2 is a top plan, with a part broken away, of the container;

Fig. 3 is a fragmentary cross sectional view of a removable end closure positioned above the open end of the container prior to being attached thereon;

Fig. 4 is a fragmentary cross sectional view showing the removable end closure attached to the end of the body; and

Fig. 5 is a cross sectional view of an alternative form of removable end closure.

Referring to the drawings, there is shown a container 10 which comprises a tubular container body 11 and two end closures 12 and 13 which are individually secured to the body 11.

The container body 11 is preferably made from paper or plastics material and may be formed as a cylinder. In the embodiment shown the container body 11 is a paperboard body of circular cross-section having a lapped seam 11a, Fig. 2. The seam may be skived. The body 11 may be made in the manner more fully described in U.S. Patent 3,338,142 dated August 29, 1967.

Preferably, the exterior and interior surfaces of the body are coated with a plastics material such as polyethylene, polypropylene or the like. If desired, the body 11 may be a laminated structure including a metal foil bonded to the interior surface. A plastics film may also be used as a substitute for the plastics coating. The plastics coating is used primarily to impart water resistant characteristics to the body, while the metal foil is used primarily to reduce air permeability through the container walls.

The end closures are preferably made from a suitable plastics material, for example a thermoplastics material such as polystyrene, polypropylene, and the like, or the plastics material may be a thermosetting plastics such as phenol-formaldehyde, polyvinyl chloride, butadiene styrene or the like. The end closure is formed as by moulding to a thickness of about 11 mils.

As shown in Fig. 3, the removable end closure 12 includes along the outer periphery thereof an inverted channel 14. The channel 14 includes an inner wall 16 substantially parallel to the axis of the closure and extending peripherally from a centre panel 17. An outer wall 19 connected to the inner wall 16 by a transverse wall 18 is spaced from the inner wall 16 to snuggly receive the upper end of the container body 10. The outer wall 19 is formed with an outwardly turned lip 21 which serves to facilitate guiding of the channel 14 on to the body 11. The inner wall is slightly inclined towards the axis of the end closure to assist in centering the end closure 12 on the body 11.

A laterally extending pull tab lip 24 may be formed along a portion of the lip 21.

The removable end closure may alternatively be made solely from paper, or if desired paper coated or laminated with plastics and/or metal. In the embodiment of Fig. 5 there is shown a removable end closure 112 comprising a laminate including an outer laminate layer 113 of paper, an intermediate layer 114 of plastics and an inner layer 115 comprising aluminium foil. The end closure 112 is formed with a channel 116 having an outer wall 117 and an inner wall 118. The walls 117 and 118 are connected by a transverse wall 119. The channel 116 extends peripherally from a centre panel 120.

For securing the end closure 12 to the container, an adhesive 22 is applied along the mouth rim 23 of the container body 11. The cover is then applied so that the walls 16 and 19 snuggly embrace the sides of the container body.

In each embodiment of the invention the adhesive may be solvent based or, preferably, water and rubber based and characterized by being pressure sensitive and capable of retaining its tackiness for prolonged periods at normal room temperatures when exposed to air. More significantly, the adhesive has relatively high shear values and low peel values. The term "shear" as used herein refers to those forces which resist separation in planes parallel to the surfaces bonded by the adhesive. The term "peel" as used herein is intended to define those forces which resist separation in a plane normal to the surfaces bonded by the adhesive. An adhesive having the desired characteristics is sold under the name ADFLEX and number 3326 made by Adhesive Products Corp. 1600 Boone Avenue, Bronx, New York 10460. This adhesive is capable of permitting peeling of the removable end closure therefrom while at the same time resisting separation of the end closure along planes parallel to the surfaces of the contacting wall portions of the end closures 12 or 112 and the end of the container body wall 11.

As above described, the adhesive is pressure sensitive and forms a seal at normal room

temperatures. This makes it possible to apply the end closure 12 to the container with a simple end closure-applying apparatus which need only exert sufficient pressure to seat the end closure 12 to the position shown in Fig. 4. It is to be noted that the adhesive 22 initially on the rim 23 of the container body 11 is now also spread on the inner sides of the inner and outer walls 16, 19. This increases the amount of bonding surface so that the resistance of the end closure to shear is greatly enhanced. At the same time, the peel characteristics remain substantially the same.

Similar removable end closures 12 and 112 may be adhered to the opposite ends of the container body 11. To open the container the pull tab lip 24 is grasped and pulled so that the channel wall 19 is pulled from the adhesive normal to the container body 11 so as to be peeled therefrom. The peeling force is continued over the upper edge and inner surface about the entire circumference of the wall until the end closure 12 is completely removed.

If each end of a container is of similar structure with a removable end closure 12 adhered by an adhesive 22, it is readily apparent that either one or both end closures 12 of the container 10 may be opened. It is particularly advantageous to be able to remove both end closures when a frozen product is to be removed from the container body. With both end closures removed, the frozen product may be pushed out from one end of the container body.

The following example and tables will further illustrate the invention. In each case the end closure 12 was made from a moulded polystyrene and the body surface to which the end closure was adhered by the adhesive mentioned above are identified in the tables. Table I sets forth the peel values obtained and Table II, the shear values which were obtained in accordance with standard testing procedures on an Instron Tester.

TABLE I

Peel Values — in lbs/sq. in.

	Container Surface		
End Closure No.	Low Density Polyethylene	Aluminium Foil	Paper
1	2.1	2.0	2.9
2	2.9	2.6	2.7
3	3.1	2.3	2.7
4	2.0	2.3	2.8
5	1.7	2.2	2.6
Average	2.5	2.3	2.7

TABLE II

Shear Values — in lbs/sq. in.

End Closure No.	Container Surface		
	Low Density Polyethylene	Aluminium Foil	Paper
1	19.5	37.1	24.8
2	24.5	32.1	21.6
3	44.0	29.0	21.5
4	27.4	38.4	21.8
5	32.0	36.0	30.1
Average	29.5	37.5	24.6

Many of the samples were drop tested from a height of about 3 or 4 feet. The container body 11 was made with a lap seam bonded by a pressure and temperature responsive adhesive. The drop tested container body 11 failed at the lap seams while the end closures 12 remained attached on the body. Apparently, the yieldable characteristics of the relatively thin polystyrene from which the end closures 12 are made serves as shock absorber means and reduces the stresses at the adhered surfaces.

Cracking of the end closures 12 occured by fatigue failure at the juncture of the upstanding wall 19 and the centre panel after about 30 drops.

WHAT WE CLAIM IS:—

1. A container comprising a tubular body opposite ends of which are closed by end closures individually secured to the body and at least one of which is a removable end closure sealed to the body by a pressure-responsive adhesive, the seal being effected by pressure applied to the end removable end closure at normal room temperature and being such as to permit the removable end closure to be peeled from the body.

2. A container according to Claim 1, wherein the adhesive is of a kind which remains tacky for prolonged periods at normal room temperatures so that the removable end closure, or each such closure may be re-sealed to the body after removal by peeling.

3. A container according to Claim 1 or Claim 2, wherein the adhesive has a low peel strength and a high shear strength as herein defined.

4. A container according to any one of Claims 1 to 3, wherein the removable end closure, or each such closure, includes a peripheral wall which overlies a portion of the container body and is sealed to the body by the adhesive.

5. A container according to Claim 4, wherein the peripheral wall is one of two walls respectively overlying the inner and the outer sides of the body, said walls being upstanding from a central panel of the end closure and connected by a transverse wall which overlies a rim of an end of the body, and wherein each of the walls is sealed to the body by the adhesive.

6. A container according to Claim 5, wherein that wall of said two walls which overlies the outer side of the body is provided with an outwardly turned lip to facilitate guiding of the end closure on to the body.

7. A container according to Claim 6, wherein the other of said two walls is slightly inclined towards the axis of the end closure to facilitate guiding of the end closure on to the body.

8. A container according to Claim 6 or Claim 7, wherein a pull tab lip extends laterally from the out-turned lip.

9. A container according to any one of Claims 1 to 8, wherein the container body is made of paper and has exterior plastics surfaces and the removable end closure, or each such closure, is made from a plastics material.

10. A container according to any one of Claims 1 to 9, wherein the adhesive is water and rubber based.

11. A container according to any one of Claims 1 to 10, wherein the removable end

closure, or each such closure, is constructed substantially as herein described with reference to Fig. 5 of the accompanying drawings.

12. A container constructed and arranged to operate substantially as herein described with reference to the accompanying drawings.

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1298790 COMPLETE SPECIFICATION
1 SHEET This drawing is a reproduction of the Original on a reduced scale

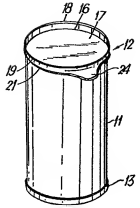

Fig.1.

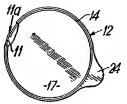

Fig.2.

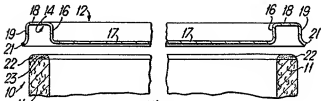

Fig.3.

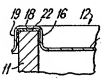

Fig.4.

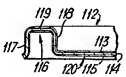

Fig.5.